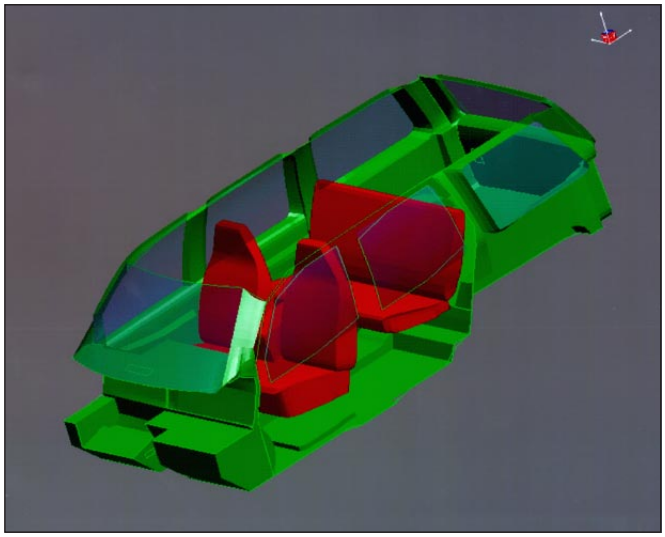
Integrated Product-Process Design System Improves Automotive Industry's Simulations-Based Design Capability



Payoff

The advanced software program called Adaptive Modeling Language™ (AML™) offers an improved understanding of what is needed in an integrated conceptual design environment to optimize cost and reduce trial and error production to test conceptual engineering designs. Ongoing use and evaluation of AML™ by Ford Motor Company, Volvo, Lockheed Martin, Boeing and other companies demonstrates it's diverse potential as an effective way of improving product and process design.

Accomplishment

An advanced computer-aided design program developed by the Materials and Manufacturing Directorate and TechnoSoft Inc. for improving airframe design processes, has been identified by manufacturers as a system for improving the design of automotive support systems such as heating, ventilation and air conditioning systems and engine combustion chamber design and analysis. The Adaptive Modeling Language™ (AML™) program offers the benefit of an efficient and user friendly environment in which to develop integrated product and process designs.

Background

The Directorate, working with researchers from Case Western Reserve University and the University of Cincinnati, embarked on an in-house research project in 1989 to enable a feature-based, product-process design capability. As a result of further development by TechnoSoft Inc., under a Small Business Innovation Research program, AML™ evolved into an object-based modeling language for integrated product and/or process design, analysis and simulation. *Adaptive modeling* is enabled by "object-coupling" between user defined shape, process and material features. These user-defined objects and their associated constraints, such as costs, interact to create optimal results in an interactive design environment. AML is not a legacy system working with technology upgrades; it is a compact computer-aided design system. Lockheed Martin has partnered with TechnoSoft to use AML as the underlying framework for the integrated development of a mechanical and optical design for an interactive gimbal for aircraft threat and detection systems. TechnoSoft has also developed a "tow placement and ply design" system with the Boeing Company to automate process design of polymer-based laminate composites with dramatic savings projected. Ford Motor Company's initial application has been in the climate control area where AML has been used to design and deploy an "Interior Climate/Comfort Engineering" system to improve customer satisfaction, climate control system robustness and reduce vehicle development costs. Volvo is using AML to design new fuel efficient combustion chambers.